

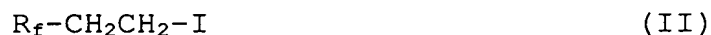
Claims

1. A metallic copper catalyst for use in an ethylene addition reaction to provide a
5 polyfluoroalkylethyl iodide from a polyfluoroalkyl iodide and ethylene.

2. The metallic copper catalyst according to Claim 1, wherein the polyfluoroalkyl iodide is a compound represented by Formula (I):



wherein R_f is a C_{1-6} polyfluoroalkyl; and the polyfluoroalkylethyl iodide is a compound represented by Formula (II):



15 wherein R_f is as defined above.

3. A process for producing a polyfluoroalkylethyl iodide represented by Formula (II):



wherein R_f is a C_{1-6} polyfluoroalkyl,
20 the process comprising the step of reacting ethylene with a compound represented by Formula (I):



wherein R_f is as defined above, in the presence of a metallic copper catalyst.

25 4. The process according to Claim 3, wherein the

metallic copper catalyst is a powdery metallic copper or a metallic copper supported on a carrier, and the reaction is conducted at a temperature of 50-200°C under a pressure of 0.01-3 MPa.

5 5. A process for producing polyfluoroalkylethyl iodide (IV), the process comprising steps (a) and (b) conducted in the presence of the same metallic copper catalyst:

 (a) a step of reacting tetrafluoroethylene with
10 a compound represented by Formula (I):



wherein R_f is a C_{1-6} polyfluoroalkyl, to produce a compound represented by Formula (III):



15 wherein n is an integer from 1 to 8 and R_f is as defined above; and

 (b) a step of reacting ethylene with compound (III) obtained in step (a) to produce a polyfluoroalkylethyl iodide represented by Formula (IV):



wherein R_f and n are as defined above.

 6. A process for producing polyfluoroalkylethyl acrylate (VI), the process comprising steps (a), (b) and (c), steps (a) and (b) being conducted in the presence of
25 the same metallic copper catalyst:

(a) a step of reacting tetrafluoroethylene with a compound represented by Formula (I):



wherein R_f is a C_{1-6} polyfluoroalkyl, to produce a compound
5 represented by Formula (III):



wherein n is an integer from 1 to 8 and R_f is as defined above;

(b) a step of reacting ethylene with compound
10 (III) obtained in step (a) to produce a compound represented by Formula (IV):

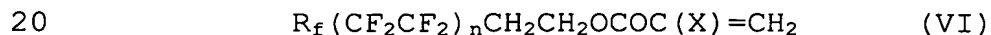


wherein R_f and n are as defined above; and

(c) a step of reacting compound (IV) obtained in
15 step (b) with a carboxylate represented by Formula (V):



wherein X is H or CH_3 and M is an alkali metal, to produce a polyfluoroalkylethyl acrylate represented by Formula (VI):



wherein R_f , n and X are as defined above.

7. A process for producing a polyfluoroalkylethyl acrylate represented by Formula (VII):



wherein R_f is a C_{1-6} polyfluoroalkyl, and X is H or CH_3 ,

the process comprising reacting a polyfluoroalkylethyl iodide obtained according to the production process of Item 3 and represented by Formula

5 (II):



wherein R_f is as defined above, with a carboxylate represented by Formula (V):



10 wherein X is as defined above, and M is an alkali metal.